

**DETAILED ACTION**

**EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. James E. Armstrong (Reg. No. 42,266) on April 21, 2009.

2. Claim 1, line 12: delete the words "(in the general formula (1)," and insert – wherein--.

Claim 1, line 15: after the word "group" delete the bracket.

Claim 1, line 19: delete the words "(in the formula (2)," and insert – wherein--.

Claim 1, line 21: after the word "group" delete the bracket.

Claim 2, line 6: delete the words "(in the general formula (2)," and insert – wherein--; after "NR-SO<sub>2</sub>" delete the bracket and insert --, wherein---.

Claim 2, line 7: after the word "atoms" delete the bracket.

Claim 2, line 10: after the number "20" delete the bracket.

Claim 3, line 3: after the words "by the general formula (3)" delete the bracket and insert --,--; after "NR-SO<sub>2</sub>" delete the bracket and insert --, wherein---.

Claim 3, line 4: after the word "atoms" delete the bracket.

Claim 3, line 7, after the words "by the general formula (2)" delete the bracket and insert --,--.

Claim 4, line 2: after the words "by the general formula (3)" delete the bracket and insert --,--.

Claim 4, line 3: after "NR-SO<sub>2</sub>" delete the bracket and insert --, wherein---; after the word "atoms" delete the bracket.

Claim 4, line 4: after the words "by the general formula (2)" delete the bracket and insert --, wherein--.

Claim 4, line 5: after the numbers "6 or 8" delete the bracket.

Claim 5, line 7: after the word "mole" delete the bracket and insert --,--.

Claim 5, line 13: delete the words "(in the general formula (4)), and insert -- wherein--.

Claim 5, line 14: after "SO<sub>2</sub>-NR-" delete the bracket and insert --, wherein---;

Claim 5, lines 15 and 16: after the word "atoms" delete the brackets.

Claim 5, line 20: delete the words "(in the general formula (5)), and insert -- wherein--.

Claim 5, line 23: after the word "other" delete the bracket.

Claim 6, line 2: after the words "by the general formula (4)" delete the bracket and insert --, wherein--.

Claim 6, line 3: after "SO<sub>2</sub>-NR-" delete the bracket and insert --,---; after the word "atoms" delete the brackets.

Claim 6, line 5: after the numbers "6 or 8" delete the bracket.

Claim 6, line 6: after the words "by the general formula (5)" delete the bracket and insert --, wherein--; the numbers "6 or 8" delete the bracket.

Claim 7, line 17: delete the words "(in the general formula (6)," and insert—wherein--.

Claim 7, line 22: after the word "group" delete the bracket.

Claim 7, after the formula (7) delete the words "(in the general formula," and insert—wherein--.

Claim 7, the last line: after the number "6" delete the bracket.

Claim 8, line 3: after the words "by the general formula (6)" delete the bracket and insert --, --; after the word "wherein" delete comma.

Claim 8, lines 10 and 12: after the word "atoms" delete the brackets.

Claim 8, line 11: after the words "by the general formula (7)" delete the bracket and insert --, --; after the word "wherein" delete comma.

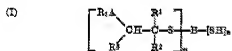
### ***Allowable Subject Matter***

3. Claims 1-8 are allowed.
4. The following is a statement of reasons for the indication of allowable subject matter: the present claims are allowable over the closest references: Falk et al. (U. S. Patent 3,758,447), Falk et al. (U. S. Patent 3,866,201), and Kleiner et al. (U. S. Patent 3,819,666).

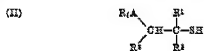
With regard to the limitations of claims 1-8, Falk'447 discloses a formation of polymers which contain perfluoroalkyl groups. These perfluoroalkyl groups lower the free surface energy of the polymer (col.1, lines 18-21). The R<sub>f</sub>-containing mercaptans

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involved as chain transfer agents for use during the free radical polymerization are of the following types (col. 2, line 50 through col. 3, line 41)



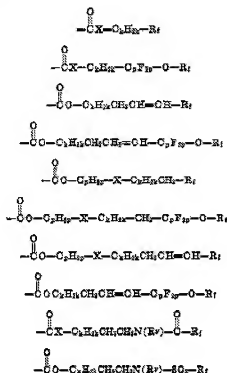
and



wherein

$R^1$ ,  $R^2$  and  $R^3$  are hydrogen, methyl,  $R_4A$  or  $R_4ACH_2$  with the requirement that at least one or two of  $R^1$ ,  $R^2$  and  $R^3$  represent  $R_4A$  or  $R_4ACH_2$ ;  $R_4$  is a perfluoroalkyl group of 2 to 18 carbon atoms and more preferably 6 to 12 carbon atoms;

AR<sub>1</sub> is



or



X is oxygen or sulfur;  
 k is zero to 10;  
 p is 2 to 12;  
 R' is hydrogen or alkyl of 1 to 4 carbon atoms;  
 B is an inert linkage group;  
 m is 1 to 10;  
 n is 1 to 9.

In the above definition for formula I, B is required to be an inert linkage group. "B" and "J" denote identical inert linkage groups and are used interchangeably (col. 3, lines 42-45).

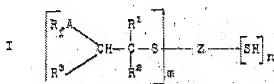
With regard to the limitations of claims 1-8, Falk'447 discloses perfluoroalkyl group containing mercaptans and sulfides having soil repellent properties if applied to substrates such as textiles, paper and leather and being useful as intermediates for the synthesis of soil repellent polymers. The adducts are obtained by the base or free

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radical catalyzed addition of hydrogen sulfide or mono- or polymercaptans to perfluoroalkyl group containing esters of fumaric, maleic, citraconic, mesaconic, itaconic, methylene malonic or aconitic acid (abstract).

The compounds are of the following formula (col.1, line 11 through col. 3, line

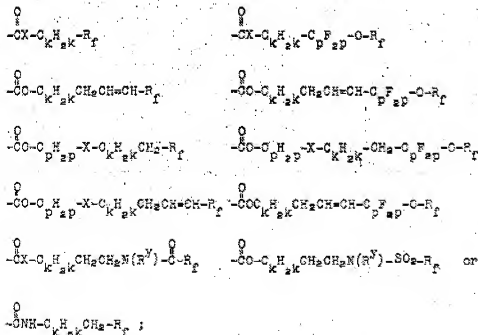
10):



wherein  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  are hydrogen, methyl,  $\text{R}_f\text{A}$  or  $\text{R}_f\text{ACH}_2$  with the requirement that at least one or two of  $\text{R}^1$ ,  $\text{R}^2$  and  $\text{R}^3$  represent  $\text{R}_f\text{A}$  or  $\text{R}_f\text{ACH}_2$ ,  $\text{R}_f$  is a perfluoroalkyl group of 2 to 18 carbon atoms and more preferably 6 to 12 carbon atoms;

$\text{AR}_f$  is

$\text{AR}_f$  is



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X is oxygen or sulfur;

K is zero to 10;

p is 2 to 12;

R<sup>u</sup> is hydrogen or alkyl of 1 to 4 carbon atoms;

Z represents B, H or



with the proviso if Z represents H, n will be zero and  
m will be 1, or if Z represents



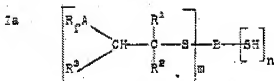
n will be zero and m will be 1

B is an inert linkage group;

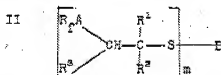
m is 1 to 10;

n is zero to 9.

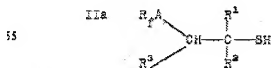
When Z equals B and n is a positive integer greater  
than zero, a compound of the following formula is ob-  
tained:



In contrast if Z represents B but n equals zero, the  
following is realized:



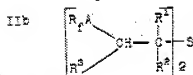
If Z represents H, n will be zero, m will be one and  
the compound will be:



50 If Z represents



the compound is:

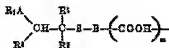


In the above definition B is required to be an inert linkage group. Inert in the present context is employed in its normal definition so that B remains as a discrete unreacted group in the starting and final compounds.

Kleiner discloses perfluoroalkyl group containing acids. These compounds are useful in preparing polymers or salts such as chromium complexes which possess oil and water repellent properties. The perfluoroalkyl group containing acids have the following general structure (col. 1, line 21 through col. 2, line 25):



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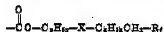
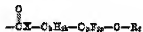


wherein

$R^1$ ,  $R^2$  and  $R^3$  are hydrogen, methyl,  $R_2A$  or  $R_2ACH_3$  with the requirement that at least one or two of  $R^1$ ,  $R^2$  and  $R^3$  represent  $R_2A$  or  $R_2ACH_3$ .

$R_2$  is a perfluoroalkyl group of 1 to 18 carbon atoms and more preferably 6 to 12 carbon atoms;

$AR_2$  is





However, Falk'447, Falk201 and Kleiner et al. do not disclose or fairly suggest the instantly claimed fluorine-containing photocurable composition containing a (meth)acrylate having a fluorinated alkyl group (A) and a photopolymerization initiator (B); wherein the (meth)acrylate (A) includes a functional group (A-i) represented by general formula (1) in which a fluorinated alkyl group is included at the terminal end thereof, and two or more (meth)acryloyl groups (A-ii), and the fluorine atom content in one molecule of the (meth)acrylate (A) is 25% by weight or more, and molecular weight of the (meth)acrylate (A) is 500 to 4000, because all of the above references particularly contain "carbon-carbon" bond between the backbone and fluorinated alkyl group which is included at the terminal end; such connection of terminal end group is different from the structure represented by general formula (1) through —O— bridge, as per claim 1.

5. As of the date of this Notice of Allowability, the Examiner has not located or identified any reference that can be used singularly or in combination with another

reference including I Falk'447, Falk201 and Kleiner et al. to render the present invention anticipated or obvious to one of ordinary skill in the art.

6. In the light of the above discussion, it is evident as to why the present claims are patentable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delay, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reason for Allowance".

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL M. BERNSHTEYN whose telephone number is (571)272-2411. The examiner can normally be reached on M-Th 8-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael M. Bernshteyn/  
Examiner, Art Unit 1796

/M. M. B./  
Examiner, Art Unit 1796

/David Wu/

Supervisory Patent Examiner, Art Unit 1796